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State of Utah
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

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Reply to: State of Utah
Division of Water Quality
Department of Environmental Quality
Salt Lake City, Utah 84114-4870

August 14, 1991

Mr. Jerry Riding, Manager
CBC Enviro Engineering
P.O. Box 30777
Salt Lake City, Utah 84130

RE: Jumbo Mining Company H-10 Heap
Leach Pad Feasibility Study
Millard County, Utah

Dear Mr. Riding:

We have received a preliminary feasibility study on the subject project on June 12, 1991. We have reviewed this study and have the following comments for incorporation into a revised feasibility study document:

I. Although not originally included as part of the scope of this study, the ponds for the pregnant and barren liquors will need to be replaced due to their age and outdated design. Some design examples are attached for your use.

II. Per page 9 and 11, is the permeability expressed as the coefficient of permeability, K, in Darcy's Law, Q=KiA?

III. Figure 3-1 appears to have been inadvertently deleted. This figure is stated to depict soil thicknesses at the pad site. Please include.

IV. An adequate stockpile of clay for engineered base and secondary clay liner should be assessed as to quantity and availability of such.

V. On page 15, the flexible membrane liner (FML) is listed as 30-mil PVC. What type of cushion is to be used on top of the FML? Will the FML meet the requirements of NSF 54 with the secondary clay liner and cushion to be used?

VI. A rationale for spacing of leak detection piping and thickness of the leak detection media should be shown, including application rate of leaching and a potential leakage event.

VII. In addition to the leak detection piping system, a simple piezometer head monitoring system is needed within the process ore pile area. Piezometers should be placed to detect the head on the primary liner. The head on the FML cannot exceed 1-foot. Design and location of such is needed.

VIII. The location and the depth of flow in the perimeter channels on the pad should be addressed.

IX. Use of small clay dams spaced transversely to the perforated leak detection piping trenches is required in order to increase leak detection sensitivity.

X. Per drawing figure 5-1, the open conveyance channels must be double FML lined. We suggest the following:

a) A geonet be placed between the liners.

b) The leak detection media should end at the toe of the slope of the ore cushion material. Thereafter secondary clay liner material be used in its place.

c) The four-inch perforated drain riser pipe should have a small designed sumps within the bottom of the channel consisting of leak detection media into which the perforations are submerged. The sumps should be strategically placed.

d) The lower FML should line the bottom of the sumps for entrapment of leaks through the upper FML along the open channel area. Geonet should cover the top of such sumps, over which the top FML covers.

e) A geofabric material should protect the FML from the leak detection media within the sumps.

XI. An approved operations and maintenance manual for the heap leach system will be needed in order to make standard operating procedures for the new heap. A detailed outline for this manual will be required prior to permit issuance. The manual must include general operation requirements, including safety, leak monitoring, state submittals, and leak and spill reporting requirements.

XII. The thickness and material of the leak detection base must insure an acceptable response time.

XIII. A QA/QC program for the construction will have to be approved as part of the specifications for the construction permit.

XIV. The size gradation of the ore to be processed, including maximum size, should be provided.

I suggest that we discuss these items prior to beginning inclusion of them into the final plan. Please feel free to call me at 538-6146.

Sincerely,

David A. Rupp

David A. Rupp, P.E.
Design Evaluation Section

Enclosures

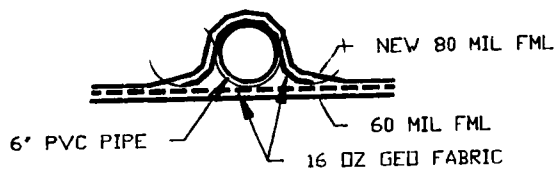
DAR:rvg

cc: Ed King, Jumbo Mining
Wayne Hedberg, DOGM

N: JMCSTCMT.#1

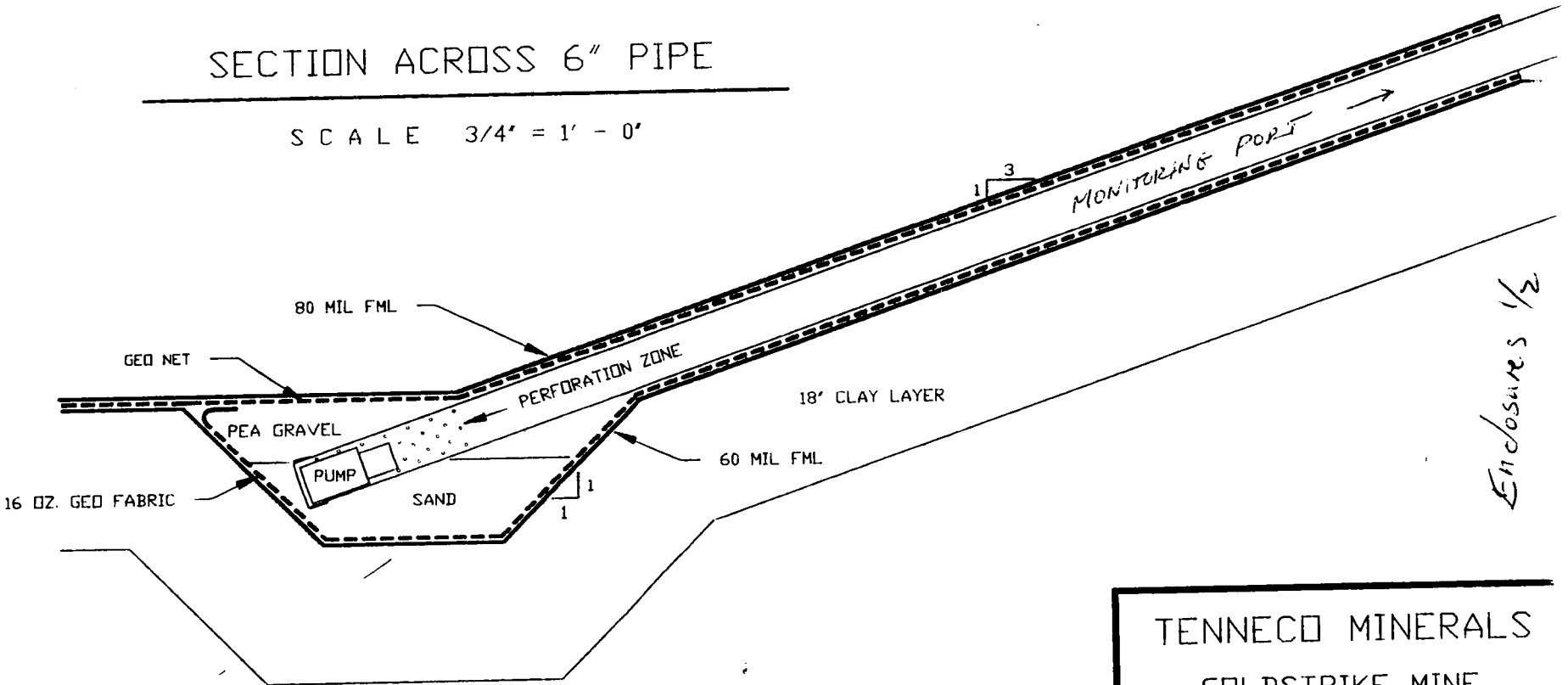
XV.FILE: JUMBO MINING, BEST FILE INDUSTRIAL WW

ALTERNATIVE WATER BREAK SYSTEM FOR POND USING GEONET, IN-LINE PUMP, AND ANGLED MONITORING LINE.



SECTION ACROSS 6" PIPE

SCALE 3/4" = 1' - 0"



SECTION THRU SUMP ALONG 6" PIPE

Enclosure 1/2

TENNECO MINERALS

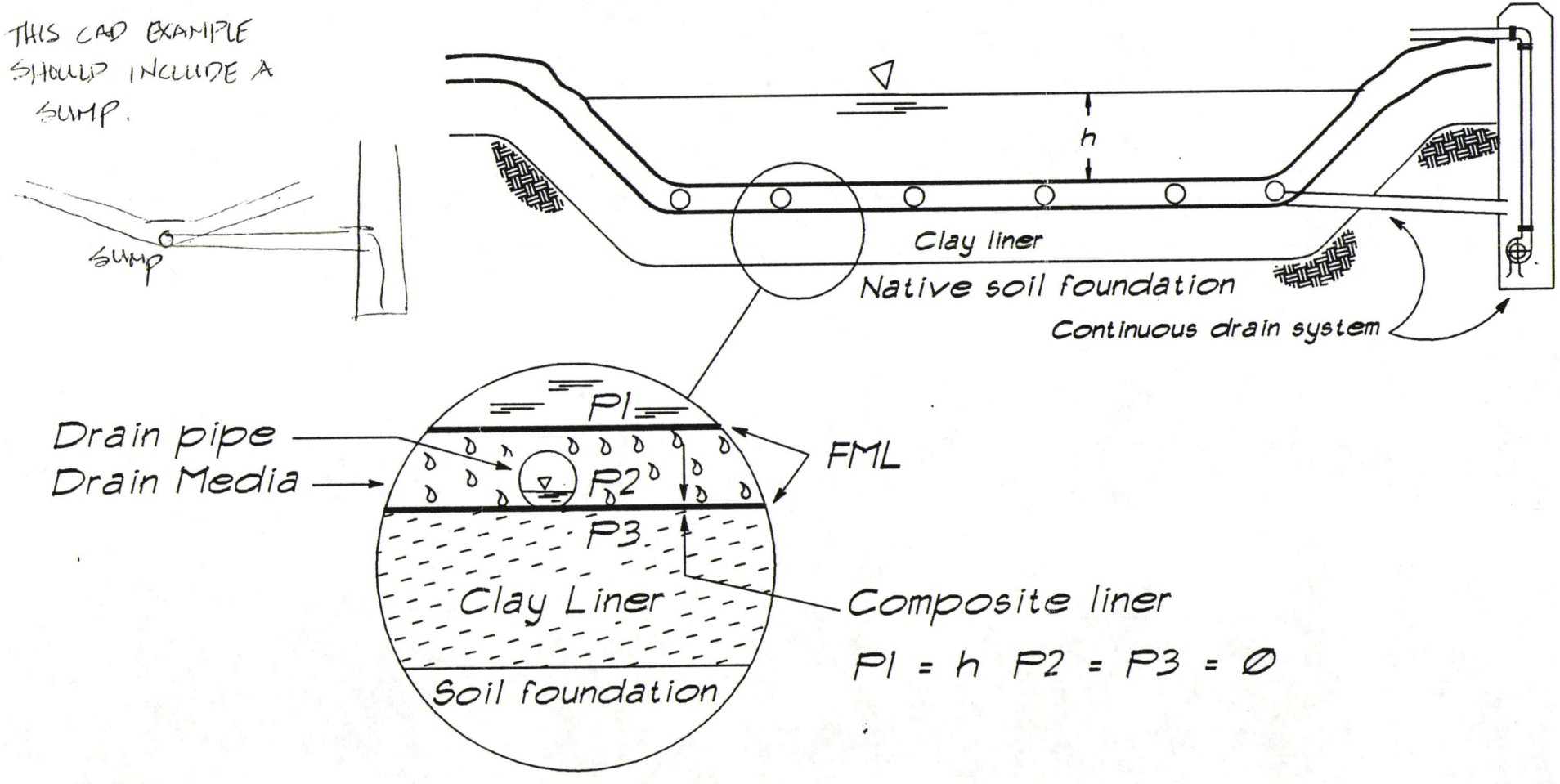
GOLDSTRIKE MINE

RECYCLE / NEUTRALIZATION POND

(PREVIOUSLY CALLED PROCESS POND)

LEACHATE RECOVERY SYSTEM, SUMP & OVERLINER

Double FML and Fluid Collection System



PROCESS POND

Enclosures 2/2